

Claims

1. Comminution machine (1) for comminuting soft to medium hard comminution material (2), comprising a closed working cylinder (4) having comminution holes 5 and comprised of material with inherent stiffness and comprising tools (6) arranged within the working cylinder (4) and rotating relative to the working cylinder, which tools are seated on a shaft (7) coaxial to the working cylinder (4) and have vanes (9) which revolve at a spacing (10) of at most the diameter of the comminution holes (5) practically contactless relative to the working cylinder (4) and are slanted (12) with their outer edges (11) counter to the relative rotational direction (33; 34), and further comprising a machine housing (3) which is connected to a channel system between a feed channel (13) and a removal channel (14), characterized in that
 - 1.0 the orientation (15) of the shaft (7) and the axial orientation (15) of the working cylinder (4) extend so as to deviate from a vertical line (16) and that
 - 1.1 an end face opening (17) of the working cylinder (4) is connected to the feed channel (13) and the
 - 1.2 lower cylinder half (20) of the working cylinder (4) is connected to the removal channel (14), and that
 - 1.3 the other end face opening (21) of the working cylinder is closed by a freely accessible lid (22), wherein the diameter (23) of this end face opening (21) is at least as large as the greatest diameter (24) of the working cylinder (4), and that
 - 1.4 the shaft (7), extending from the side of the feed channel (13), extends at most to the inner wall (25) of the lid (22) but does not penetrate it.
2. Comminution machine according to claim 1, characterized in that one end of the working cylinder (4) in the area of the inlet opening of the feed channel

(13) is centered in the machine housing (3) and the other end of the working cylinder is centered in the lid (22), and that the lid (22) also takes over the axial fixation of the working cylinder (4).

3. Comminution machine according to claim 1, characterized in that the working cylinder (4) is immobile and configured to be fixed in several rotational positions.
4. Comminution machine according to claim 3, characterized in that the working cylinder (4) at the end face is clamped over the entire periphery by centering devices (27, 28), respectively.
- 10 5. Comminution machine according to claim 2, characterized in that the centering devices (27 or 28) are rotatably (29,30) supported and that the working cylinder (4) has an external rotary drive (31) which, independent of the mountability of the lid (22) engages on the working cylinder (4).
- 15 6. Comminution machine according to claim 5, characterized in that the tools (6) are stationary and immobile and that the working cylinder (4) is rotatingly driven.
7. Comminution machine according to claim 5, characterized in that the working cylinder (4) and tools (6) are driven (31, 32) independently and in opposite directions relative to one another (33,34).
- 20 8. Comminution machine according to one of the claims 1 to 4, characterized in that the working cylinder (4) is stationary and immobile and that the tools (6) are driven in rotation (32).

9. Comminution machine according to one of the claims 1 to 8, characterized in that the shaft (7) penetrates the feed channel (13) and is free of shaft steps in the feed channel.

10. Comminution machine according to claim 9, characterized in that the tools (6) are seated on the periphery of a separate rotor (8) which is fixedly connected by a feather key (35) to the shaft (7) for torque transmission.

11. Comminution machine according to claim 8, characterized in that the shaft (7) is supported in a floating arrangement outside of the feed channel (13).

12. Comminution machine according to one of the claims 1 to 11, characterized in that the lid (22) is connected with one end face (38) flat against a counter surface of one end of the machine frame (3) by screwing (26).

13. Comminution machine according to claim 12, characterized in that the tools (6) with their transverse edge (36) rotate on the inner side of the lid (22) by avoiding surface contact but at a spacing as minimal as possible relative to the inner side of the lid (22).

14. Comminution machine according to one of the claims 1 2 13, characterized in that on the side of the machine housing (3) opposite the lid (22) a flat housing wall (39) is provided on which the oppositely positioned transverse edges (37) of the tools (6) rotate by avoiding surface contact but with a spacing as minimal as possible to the inner side of the lid (22).

15. Comminution machine according to one of the claims 1 to 14, characterized in that the working cylinder (4) is straight-cylindrical, and that the orientation

of the shaft (7) and the axial orientation of the working cylinder (4) extend horizontally.

16. Comminution machine according to one of the claims 1 to 14, characterized in that the working cylinder (4) is conical.
- 5 17. Comminution machine according to claim 16, characterized in that the lower surface line (40) is positioned to the horizontal line at an angle between zero degrees and approximately 30 degrees.